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### Retention of Viability in Lyophilized Spores of the Fiddlehead Fern, *Matteuccia pensylvanica*<sup>1</sup>

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For many years, residents of New Brunswick, Canada, have used young tender rolled fronds of *Matteuccia pensylvanica* as a table vegetable. In recent times, this use has assumed such economic importance that curled fronds are now gathered in the spring as a fresh crop, or are commercially processed either by freezing or canning. There has been no attempt at raising them commercially. Instead, they are harvested with difficulty from their wild habitat in shaded places along rivers and streams, mostly by Indian laborers. Because of the increasing importance of this crop, one of us (R.G.W.) has undertaken to study the propagation and management of these plants on a regularized basis.

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There is a somewhat sparse literature on the handling of fern spores. However, it has been noted (Bold, 1957) that spores of *Osmunda* spp. must be sown shortly after they mature. Further, Campbell (1887) reported that *Onoclea* sp. spores begin germination within a very few days and therefore grow rapidly to form the prothallus. On the other hand, Bailey (1915) reported that these organs, properly stored, can be kept alive for long periods. No statement could be found concerning the possibility of lyophilization, although similar techniques had been effectively employed in the preservation of ginkgo pollen (Tulecke, 1954) (but not the pollen of *Pinus palustris* Mill.) (Hesseltine & Snyder, 1958) and in various fungal diaspores (Mehrotra & Hesseltine, 1958). In consequence, it was decided to obtain this information with respect to this fern species.

Spores were collected September 23, 1962, as they matured in the wild. They were shaken free of the parent frond and placed in flasks of a Virtis Macro freeze-dry apparatus and frozen quickly by partial submersion in a mixture of dry ice and ethanol. Subsequently they were freeze-dried under vacuum imposed by a Duo-seal pump for 8 hours. They then were placed in bottles and stored at  $-20^{\circ}\text{C}$ . in desiccators over Drierite crystals.

Following one and three month storage, the lyophilized spores were sown in several media: well rotted leaf mold, a mixture of peat, sand and soil, and in sterilized sphagnum. In every instance, the spores germinated readily and produced vigorous thalli. Both plantings have developed the sporophyte generation and are growing well. There has been no apparent drop in the viability of the lyophilized material.

Spores of the fiddlehead fern, *M. pensylvanica*, can undergo lyophilization and retain viability after storage for three months. How extended a storage period can be realized by this technique will be determined. It is not known at present whether this procedure will have application in the commercial growing of the fiddlehead fern. However, it may be of enhanced interest



should it be demonstrated that other fern spp., especially those difficult to store, will survive this process.

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## Shorter Notes

FERNS AND FERN ALLIES ON BONAVENTURE ISLAND, QUEBEC.—Bonaventure Island off the Gaspé Peninsula has long been a mecca for ornithologists, and it was to study sea birds that I visited that island from July 5–25, 1946. The richness of the flora and a spell of inclement weather were instrumental in my obtaining a reasonably complete collection of the pteridophytes of the island and a small collection of flowering plants, many of them not mentioned by Adams in his preliminary list of the plants of the island.<sup>1</sup>

The flowering plants and one set of the pteridophytes were deposited in the herbarium of the University of California at Berkeley and the remainder in the herbarium of the University of Michigan. Of the 29 pteridophyte species collected, only three (*Pteridium aquilinum*, *Thelypteris phegopteris*, and *Equisetum*

<sup>1</sup>Adams, J. 1940. A Preliminary list of the plants of Bonaventure Island. Canadian Field Nat. **54**: 7-9.